Aruwimi of Stanley. Here, while detained for months by a Monbuttu chief, A-Sanga, Dr. Junker suffered much from want of proper food and other causes. On the south of the Bomokandi he met with the pygmy people known as Akka or Tikki-Tikki, whom he found clever hunters, leading a nomad life. He was glad to get back to Tangasi to recruit. Crossing the Wellé in a north-west direction, he reached his new station at Semio's in September 1882. Setting out in December, he pushed southwards and westwards, touching the Wellé again at two different points, one of them being his farthest west point on this river.

The remainder of Dr. Junker's paper was occupied with the troubles caused by the Mahdi insurrection to his friends Emin Pasha and Lupton Bey. These troubles prevented Junker himself from proceeding to Europe northwards. He spent much time at Lado, where, under great difficulties, he constructed a large and beautiful map of his explorations. After being with Emin Pasha at Dufilé and Wadelai, and being detained for some time in Unyoro and Uganda, he at last persuaded King Mwanga to let him go. Crossing the Victoria Nyanza, he proceeded by one of the caravan routes to Zanzibar, and thence to Cairo, and so to Europe, where he arrived only a few weeks ago. Besides Dr. Junker's own paper, the only records of his ten years' work are a few letters which appeared at intervals in *Petermann's Mitteilungen*, so that his forthcoming work will abound with novelty. Its scientific value will be unusually great.

NOTES.

THE Royal Society's first *soirée* of the session was held last night. More trouble than usual had been taken to bring interesting things together, and the result was most satisfactory. We shall refer to some of the most striking objects next week.

WE print this week the firstfruits of a new organization for the furthering of astronomical research, which Mrs. Draper has established at the Harvard Observatory in memory of her husband. We do not think that a more noble memorial has ever been suggested to perpetuate the memory of any man, and certainly, if the fair promise of the opening work is kept up, Draper's name will go down to long distant ages. In addition to the first memoir, which we reprint, we have received from Prof. Pickering several enlarged copies of the stellar photographs already obtained. The scale of these photographs and their perfection will be gathered from the illustration which we give, and it does not seem too much to hope that within no very great number of years we shall possess photographs of the different orders of stars, with photographic spark comparisons, in which it may be quite easy to trace the lines due to the absorption of any particular element, and have, in fact, for stars of the various classes an exact equivalent of Ångström's *spectre normal* of the sun with the metallic coincidences. The friends of the late Henry Draper, and they are many in this country and on this side of the Atlantic, will thank his widow for the noble memorial she is erecting to his memory.

THE foundation-stone of the Imperial Institute will be laid by the Queen on Monday, July 4.

THIS afternoon the Croonian Lecture will be delivered before the Royal Society by Prof. H. G. Seeley, F.R.S. The subject is "*Parieasaurus bombidens* (Owen), and the Significance of its Affinities to Amphibians, Reptiles, and Mammals." On Thursday, May 26, the Bakerian Lecture will be delivered before the Royal Society by Prof. J. J. Thomson, F.R.S.

AT the general monthly meeting of the Royal Institution on Monday last, Prof. Tyndall was elected Honorary Professor of Natural Philosophy. Lord Rayleigh was elected Professor of Natural Philosophy.

THE visitation of the Royal Observatory at Greenwich takes place this year on June 4.

MR. WOODS, the President of the Royal Institution of Civil Engineers, and Miss Woods, have issued cards of invitation to a *conversazione* to be held at the South Kensington Museum on the 25th inst.

THE general meeting of the Institution of Mechanical Engineers will be held on Monday evening, May 16, and Tuesday afternoon, May 17, at 25 Great George Street, Westminster. The President, Mr. Edward H. Carbutt, will deliver his inaugural address on Monday evening. The following papers will be read and discussed, as far as time permits:—"On the Construction of Canadian Locomotives," by Mr. Francis R. F. Brown, Mechanical Superintendent of the Canadian Pacific Railway; "Experiments on the Distribution of Heat in a Stationary Steam-Engine," by Major Thomas English, R.E., of the War Office; and "On Irrigating Machinery on the Pacific Coast," by Mr. John Richards, of San Francisco.

ON Saturday evening next a lecture on "Savages" will be delivered by Sir John Lubbock in the New Schools, Oxford.

THE Deutsche Seewarte at Hamburg has published a chart showing the positions of the icebergs in the North Atlantic, compiled from reports received up to the middle of April. The chart is issued without charge to captains applying for it. As early as the first half of March several icebergs were met with south of 42° N. lat., and one even south of 41°. In drifting southwards, the icebergs, as always, are found between the meridians of 46° and 52° W.

THE fifth Bulletin of Miscellaneous Information, issued from the Royal Gardens, Kew, gives an account of bowstring hemp. This is not at present an article in commercial use, but Mr. J. G. Baker, the writer of the paper, thinks attention may well be directed to the capabilities of numerous species of *Sansevieria* for producing fibre of great value. Plants of *Sansevieria*, of which there are ten or twelve species, are very abundant on both the east and west coasts of tropical Africa, which, indeed, may be looked upon as the head-quarters of the genus. One well-known species (*S. zeylanica*) is indigenous to Ceylon; and this and others are found along the Bay of Bengal, extending thence to Java and to the coasts of China. The leaves of these plants are more or less succulent, and abound in a very valuable fibre, remarkable alike for fineness, elasticity, and for strength. Mr. Baker gives a description of those species which are now under cultivation at Kew.

THE other day Dr. Robert W. Felkin, of Edinburgh, received three letters from Emin Pasha. The latest of them is dated Wadelai, October 26, 1886, and no more recent news from the writer has reached this country. Before starting for the coast from Uganda, Dr. Junker had collected a caravan and obtained permission from King M'Wanga to send it to Wadelai. "Besides bringing me a good quantity of cloth," writes Emin Pasha, "there were many presents from yourself, as well as newspapers from 1884 to 1886, a few books, *Graphics*, and, what pleased me most and will prove most valuable, a good many numbers of NATURE, so that at last I am permitted once more to see what is taking place in the scientific world." Along with this letter Dr. Felkin received a scientific paper which will be published in the *Scottish Geographical Magazine*. It is an account of a tour to the Albert Nyanza.

IT has been decided to remove the Royal Observatory of Brussels to Uccle, about 3½ miles to the south-west of its present position. The new buildings were commenced in September 1883, and are now so far advanced that the transfer of the instruments, &c., is arranged to take place next year. Observations have already been taken at the new Observatory for about a year for the purpose of deducing corrections to be applied to the temperature-observations made in the town since 1833, to reduce them to the temperatures taken in the country.

A GERMAN mathematician has, from certain measurements effected, calculated that the quantity of snow which fell in Central Germany from December 19 to 23, between 50° and 52°·5 N. latitude and between 7° and 18° E. longitude, weighed no less than ten million tons.

THE Lord Mayor, sometime a member of the school, has arranged to be present at the opening, on May 24, of the new science and art buildings of Sir Andrew Judde's School, Tunbridge.

DR. F. DAY, F.R.S., author of "The Fishes of Great Britain and Ireland," will shortly publish with Messrs. Williams and Norgate his monograph on the Salmonidæ. It will be illustrated by coloured plates, and, in the first instance, be published for subscribers. It will be ready in July.

MESSRS. MACMILLAN will publish immediately a volume of "Essays and Addresses," by the Rev. J. M. Wilson, Head Master of Clifton College. The writer discusses the relation between ethical and theological questions and the ideas of modern science.

THE Council of the London Mathematical Society have sanctioned the issue of a complete index of all the papers printed in the Proceedings of the Society since its foundation. Seventeen volumes have been published. All persons who take an interest in mathematical researches and who wish to know what has been done by the Society in their respective branches are invited to apply to the Secretaries (22 Albemarle Street, W.) for a copy of the index.

The Clothworkers' Company of London have shown lately that they thoroughly understand the necessity for an improved system of technical education. At Dewsbury the Jubilee is to be celebrated by the establishment of a technical school, and the Clothworkers' Company have agreed to raise the local fund for the building and equipment of the institution from £10,000 to £11,000. In addition to this they have promised an annual subscription of £50 towards the maintenance of the school. The same Company, having contributed £3,500 to the fund for the erection of the Bradford Technical College, as well as £500 per annum towards its maintenance, have now promised to contribute £500 to a fund which is being raised to pay off the debt still remaining on the building. The additional buildings of the Textile Industries and Dyeing Departments of the Yorkshire College, now completed and equipped, were erected by the Clothworkers' Company at an expense of £30,000.

WE regret to learn that the amount of support given to the proposed memorial to the late Thomas Edward, the Banff naturalist, has been so small that the project is in abeyance; and the Committee are contemplating the return of the subscriptions received. It will be much to be regretted if some means of commemorating Edward cannot be found, similar to the John Duncan Prizes in the Vale of Alford. It will be remembered that a considerable proportion of the sum subscribed for Duncan in his old age was placed by him in the hands of trustees just before his death to found prizes for the encouragement of the study of botany in his own locality. Edward accomplished much more for science than Duncan, and it will be lamentable if no memorial of him can be established. Any persons who may wish to prevent the threatened abandonment of the memorial should communicate at once with Mr. John Allan, Town Clerk of Banff.

IN the *Monatshefte für Chemie* (viii. 73) Dr. K. Olszewski has a paper on the "Absorption-Spectrum of Liquid Oxygen and of Liquid Air." On examining the absorption-spectrum of liquid oxygen with the help of a small direct-vision spectroscope—employing solar light—two strong dark lines were noticed in the orange and yellow portions of the spectrum, and these did not completely disappear after the volatilization of the oxygen. They were in fact found to be present in the ordinary solar spectrum, being faint at midday, but very distinct towards sunset. On employing greater dispersion, the oxygen absorption-lines expanded to bands like the telluric bands of the solar spectrum, and they were noticed, not only when solar light was employed, but also when the electric arc or the lime-light was made use of. In these experiments the oxygen layer was 7 mm. thick, and on increasing this to 12 mm. two more bands made their appearance; namely, a very faint one in the green, and another somewhat stronger in the blue. The positions of the four oxygen bands were determined with a Vierordt's spectroscope, the wave-length numbers being—

Band in orange	634—622
,, ,, yellow	581—573
,, ,, green	535
,, ,, blue	481—478

or, taking the middle of the lines, 628, 577, 535, and 480. Line 628 is distinguished by its breadth, and 577 by its intensity; the more feeble bands, 535 and 480, appear to be absent from the solar spectrum. With the view to determine the spectrum of the other main constituent of the atmosphere, pure nitrogen was not employed, but merely air carefully freed from moisture and carbonic acid. The spectrum of the liquefied air was examined under the same conditions as in the case of the oxygen, but no new bands made their appearance. The spectrum consisted merely of the bands 628 and 577 mentioned above, and these were but faint; they became stronger as the air became richer in oxygen through the volatilization of nitrogen, but were still far less intense than in the spectrum of pure oxygen. The determination of the absorption-bands of liquid oxygen is of importance in connexion with the discussion of the origin of the telluric lines of the solar spectrum. Janssen and Secchi have shown that most of these are due to aqueous vapour, and, according to Ångström, the bands which on account of their stability cannot well be due to aqueous vapour are A, B, α, and δ, the two latter coinciding with the two strongest oxygen bands. According to Egoroff, who recently examined the spectrum of compressed gaseous oxygen, the telluric bands A, B, and probably α, are due to oxygen. Janssen obtained similar results, but found also some other bands in the spectrum of compressed oxygen. Olszewski cannot confirm either the presence or absence of the groups A and B from the absorption-spectrum of liquid oxygen, as he has been unable to make exact observations in this part of the spectrum.

ANOTHER paper by Dr. K. Olszewski in the *Monatshefte* (viii. 69) is on the "Determination of the Boiling-Point of Ozone." It has been shown by Hautefeuille and Chappuis that when ozonized oxygen is exposed to a pressure of 125 atmospheres and to the temperature of boiling ethylene (−102°·5), the ozone is obtained in the form of a dark-blue liquid which retains the liquid form for a short time at the above temperature, after the removal of the pressure. It seemed, therefore, that the boiling-point of ozone could not be much below that of ethylene, and attempts were therefore made by Olszewski to liquefy ozone at the atmospheric pressure merely by the application of cold. At a temperature of −150° no liquid was obtained, the large proportion of oxygen present probably hindering the condensation of the small percentage of ozone. When a lower temperature (−181°·4) was employed—that of boiling oxygen—the ozone readily condensed to a dark-blue liquid. At this temperature it is transparent in very thin layers, but is almost opaque in layers 2 mm. thick. In order to determine its boiling-point, the tube containing it was introduced into a vessel containing liquid ethylene cooled to about −140°. The ozone still retained the liquid form, and only began to vaporize when the temperature of the ethylene had risen to near its boiling-point. The temperature of the ethylene was determined by means of a carbon bisulphide thermometer, which at the moment of incipient ebullition of the ozone indicated a temperature of −109°, this corresponding to −106° of the hydrogen thermometer. The boiling-point of pure ozone is therefore approximately −106°. Experiments with liquid ozone require great caution on account of the readiness with which explosions occur. If, for instance, liquid ozone comes into contact with ethylene gas, an extremely violent explosion occurs in spite of the low temperature. It is therefore necessary to exclude the inflammable gas from contact with the ozone, and then explosion need not be feared.

Not less interesting than syntheses of vegetable or animal principles are the attempts which are made from time to time to build up minerals of the same crystalline form and chemical composition as those occurring upon the surface of our planet. One of the most widely distributed minerals—the historic magnetite—found so universally throughout the whole of the more basic rocks, and the square or triangular sections of which are familiar to every micro-petrologist, has long been a favourite subject for attempts, partially successful, at artificial reproduction. But probably the best method of effecting this has of late been devised by M. Alex. Gorgeu (*Comptes rendus*, No. 17, 1887), who has obtained fine crystals, sufficiently large to enable him to prove their complete identity with those of native magnetite. His method was to drop iron wire or filings into a bath of fused sulphite and sulphide of sodium, when a double sulphide of iron and sodium was formed, together with an oxide of iron richer in protoxide than magnetite; in a short time this oxidized to magnetite, and the sulphide and sulphite were converted to sulphate of sodium. The crystals of magnetite obtained, when washed free from the sodium sulphate, were a millimetre in section, of octahedral form modified by faces of the rhombic dodecahedron, and attracted by the magnet; they possessed the metallic lustre and the same specific gravity and hardness as crystals of naturally occurring magnetite.

We have received the second edition of Miss Clerke's "Popular History of Astronomy during the Nineteenth Century," published by Messrs A. and C. Black. We regard it as a most encouraging sign of the times that in a period of not over eighteen months, the first edition of such a book as this should have been exhausted. It shows that the number of persons interested in astronomical science who care to read sound treatises requiring a considerable amount of attention is on the increase, and we know no book which is likely to foster the love of the subject among such people better than Miss Clerke's. The mere process of bringing up to date has involved the insertion of a considerable amount of new matter. Celestial photography naturally comes in for an added share of attention, directed chiefly to the discoveries of nebulæ in the Pleiades by the MM. Henry and Mr. Roberts; to the work in stellar spectral photography in progress at Harvard College; and to the preliminary essays in photographic charting made at Paris, Liverpool, and the Cape of Good Hope. Other new or extended passages relate to the bright-line spectra of γ Cassiopeiæ and β Lyræ, stellar photometry, the effects of tidal friction on the satellite system of Mars, and the daylight photography of the sun's corona. The theory of sunspots unfolded by Mr. Lockyer in his "Chemistry of the Sun" finds a place in the chapter on "Solar Observations and Theories," and that on "Solar Spectroscopy" includes an account of the observations of the spectra of sunspots at South Kensington, 1879–85, with their results for solar chemistry. We notice some modification in the author's views regarding the dissociation of terrestrial elements in the sun, the presence of the bright-line spectrum of oxygen in the solar spectrum, and Young's "reversing layer." She moreover (apparently on good grounds) withdraws the statement that comets, moving sensibly in the same track in the parts of their orbits near the sun, must have nearly identical periodic times. Paragraphs in the new edition are assigned respectively to the last comer (Comet 1887 I.) of the remarkable group connected with the comet of 1843, and to the singularities of Comet Pons-Brooks; while the observations on the meteors of November 27, 1885, on the new star in Andromeda, and at Grenada during the total eclipse of August 29, 1886, are fully particularized. We are glad to perceive that Miss Clerke has taken advantage of many of the hints of her critics, supplying, for instance, the few omissions in her work pointed out by Sir Robert Ball in Nature (vol. xxxiii. p. 314). A completely new feature is a chronological table of the principal astronomical events between the years 1774 and 1887; and a frontispiece and vignette, reproducing Mr. Common's and the MM. Henry's photographs of the Orion Nebula, Jupiter, and Saturn, add to the attractions of the second edition.

The additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. G. Lester; a Brazilian Tree-Porcupine (*Sphinghurus prehensilis*) from Brazil, presented by Dr. William Studart; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented; a Domestic Sheep (*Ovis aries*, four-horned var.) from Arabia, presented by Mr. C. E. Kane; a Tooth-billed Pigeon (*Didunculus strigirostris*) from the Samoan Islands, presented by Mr. Wilfred Powell; a Great-crested Grebe (*Podiceps cristatus*) from Norfolk, presented by Mr. T. E. Gunn; a Goldfinch (*Carduelis elegans*), a Greenfinch (*Ligurinus chloris*), a Red Bunting (*Emberiza schœnichus*), British, presented by Master H. J. Walton; an Eyed Lizard (*Lacerta ocellata*) from Cannes, presented by Mr. J. E. Warburg; a Smooth Snake (*Coronella lævis*) from Hampshire, presented by Mr. H. B. Pain; a Green Turtle (*Chelone viridis*) from Ascension, presented by Dr. Keenan; a Squirrel Monkey (*Chrysothrix sciurea*) from Guiana, a Servaline Cat (*Felis servalina*) from West Africa, a Black-necked Swan (*Cygnus nigricollis*) from Antarctic America, two Natterer's Snakes (*Thamnodynastes nattereri*) from Brazil, purchased; four Prairie Marmots (*Cynomys ludovicianus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

The Melbourne Observatory.—Mr. Ellery has recently issued his Annual Report referring to the year ending June 30, 1886. From it we learn that the new transit-circle has been in constant use during the year, and is in excellent order. There appears, however, to be a very gradual lowering of the west pier of the instrument since its erection in August 1884. There also appears a decided diurnal change in the level, the east pivot being higher in the morning and lower in the evening—probably due to the heating effects of the sun on the earth's crust, or on the building. The objects observed with the transit-circle during the year comprised fundamental clock stars, standard circumpolar stars, faint stars selected from the Melbourne zones, comet stars, refraction stars, and a list of stars proposed for insertion in the *Connaissance des Temps*. The great telescope was almost exclusively devoted to the revision of the southern nebulæ. During the year 214 of Sir J. Herschel's nebulæ were finally revised, 7 were searched for but not found, whilst 30 new nebulæ were discovered. There now remain only 95 nebulæ, which were observed by former observers, requiring final revision before publication. The photoheliograph was not in working order for several months during the year, owing to difficulties arising from the change in the size of the sun pictures